43. THE ZEOLITES AS SKIN DECONTAMINANTS AGAINST NERVE AGENT SARINE IN VIVO

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INTRODUCTION

Zeolites are natural or syntetic aluminosilicates with molecular structure in shape three – dimensional net. They have ion exchange and adsorption of active behevioural efficiency.

For this study mixture of zeolites **the KW** (code Name) preparing special procedure is used. Theirs possible decontaminations' properties against sarine tested on a mice model with monitoring of vital functions and surviving.

MATERIALS AND METHODS

Mice (NOD strain) were shaved before contamination and contamination were practising by skin of back applications solution sarine in isopropanol (c=100 mg/l). (5)

The dose of that solution for mice p.c. application got by the equotion 1 (6):

$$\mathbf{d = D \times m / c} \qquad (1)$$

where is
d - the dose which applies (ml)
D – the dose per kg mice (μg/kg),
m (mass mice) = 0,03 kg,
c (concentration of solution) = 100 mg/l

First dose of p.c. sarine solution in isopropanole application was due to limit of reliability of LD_{50} took little less then literature one (6), and this is d=0,240 ml per mice (this is D=796,29 μg/kg). Next doses were growing by geometric factor 1.26.

Lethal dose (LD_{50} p.c. sarine) was calculated by tables and equotion 2 (6). For calculation lethal dose LD_{50} (p.c. sarine) is applied 4 doses (μg/kg) : 915.15; 1153.06; 1452.86; 1830.60 and number died of mice per every dose (N): 2, 3, 3, 6. Factor f was calculated of number of died mice and tables (6).

$$\mathbf{\log LD_{50} = \log D_A + \log G_f (1+f)} \qquad (2)$$

where is
D_A (first effective dose) = 915.15 μg/kg
G_f (geometric factor) = 1.26
d = log G_f = 0.1004
f = 0.2500

95% limit of reliability (L_R) was calculated by equotion 3:

$$\mathbf{\log 95\%\ L_R = \log LD_{50} \pm 2d \times q\ \sigma} \qquad (3)$$

where is
σ - factor for N (2,3,3,6) from Weil's tables (6)

After contamination by doses (μg/kg): 1452.86; 1830.60; 2306.56; 2906.26; 3661.89 and 4613.98, decontamination was done immediately of the **KW**.

For a calculation LD_{50} (p.c. sarine) after decontamination by this mixture of zeolites are aplied doses (μg/kg): 2306.56; 2906.26; 3661.89; and 4613.98 by **equotion 2**.

Terapeutic effect was calculated by equotion 4:

$$\text{T.E.} = \frac{\mathbf{LD_{50}(with\ decontamination)}}{\mathbf{LD_{50}(without\ decontamination)}} \qquad (4)$$

All survival animals from experiment were returned in cages, in conventional conditions, and their survive were monitoring in next 24 hours.

RESULTS

For the purpose of this experimental work, we determined the lethal dose of sarine **percutaneous LD_{50} (p.c. sarine) = 1208,37 μg/kg** for this strain of mice. (5,7)

The mice that were decontaminated by the **KW** survived **3.03 LD_{50}** (circa three lethal doses) of sarine p.c. (4)

95% limit of reliability (95% L_R) for LD_{50} (p.c. sarine) is **945.60 – 1544.00 μg/kg,** what is in limit of literature data. (7)

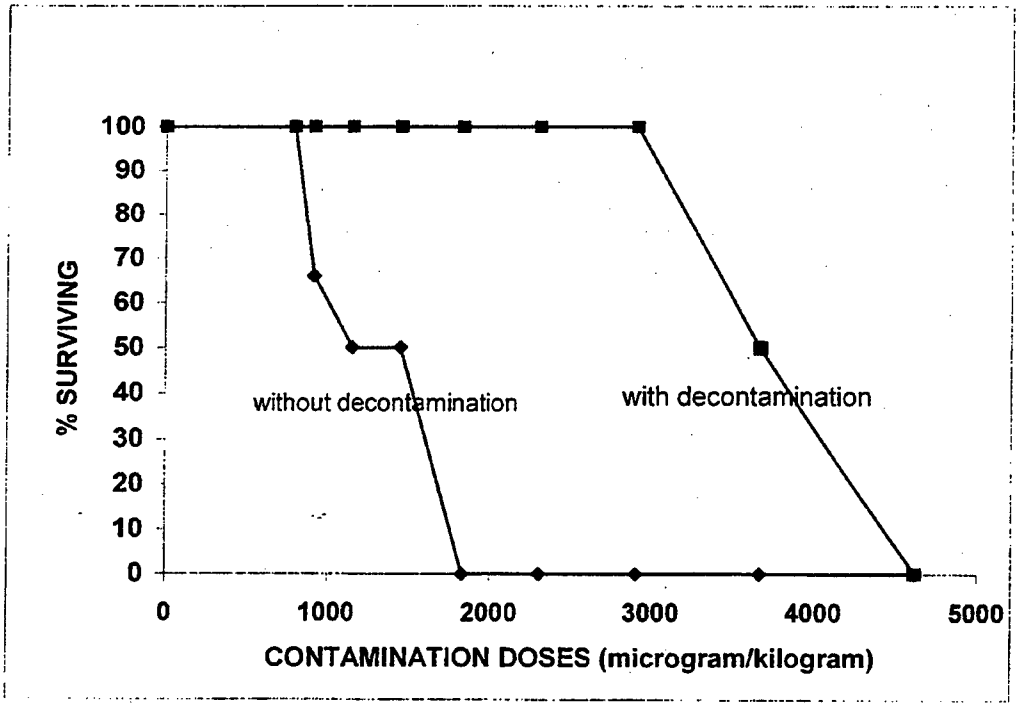

Figure 1: Surviving mice of contamination (solution sarine) with and without decontamination

CONCLUSIONS

The preliminary results show that it is possible to use **the KW** to skin decontamination sarine efficiently.

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